

REMARKS

Claims 1-12, 35 and 37-39 remain in this application. Claim 1 is amended. Claims 42-60 have been canceled. Claims 13-34, 36 and 40-41 stand withdrawn from consideration as directed to a non-elected species of the elected invention. No new matter has been added to the claims. Applicant respectfully requests reconsideration and review of the application in light of the foregoing amendments and following remarks.

At the outset, Applicant acknowledges with appreciation the allowance of Claims 5 and 10. Applicant further notes that Claim 11 is dependent upon Claim 10, and therefore should have been allowed as well. Nevertheless, the Examiner erroneously identified the claim as rejected over prior art. Applicant requests correction of the record to reflect the allowance of Claim 11.

Before addressing the merits of the rejections based on prior art, Applicant provides the following brief description of the invention. The invention is directed to a lead frame substrate for use in a lead frame package that integrates a semiconductor die and passive components in the package. The micro lead frame substrate is formed from a sheet of conductive material that is patterned to form a plurality of semiconductor die pads, termination pads, and connection bars. The semiconductor die pads are each adapted to have a semiconductor die affixed thereto. The termination pads are adapted to receive passive components (e.g., resistors, capacitors) and/or bonding wires affixed thereto.

More particularly, the connection bars further comprise permanent connection bars and temporary connection bars. The permanent connection bars provide permanent electrical connections between the semiconductor die pads and the termination pads. The temporary connection bars also couple the semiconductor die pads and the termination pads, but are intended only to provide a temporary physical connection between the pads to provide structural integrity to the lead frame substrate during assembly. Thereafter, a molding compound is applied to the lead frame

substrate, which provides permanent structural integrity to the lead frame substrate, whereupon the temporary connection bars may be removed. In another embodiment of the invention, the molding compound is applied such that top and bottom surfaces of the termination pads and the connection bars remain uncovered.

The Examiner rejected Claims 1, 2, 4, 6-9, 11, 12, 35 and 37-39 under 35 U.S.C. § 102(b) as anticipated by Pak. The Examiner also rejected Claim 3 under 35 U.S.C. § 103(a) as unpatentable over Pak in view of Sakamoto et al. Applicant respectfully traverses these rejections.

Pak discloses a clock oscillator package adapted for surface mount applications. The clock oscillator package is formed using a lead frame in which a crystal oscillator, integrated circuit, and other circuit components are electrically connected. The populated lead frame is then injected with a molding material to form an encapsulated package as shown in Figs. 4A-4C.

There are fundamental differences between Pak and the present invention. Foremost, Pak fails to suggest or disclose the use of temporary connection bars. The Examiner refers to a portion of the reference that describes the removal of side bars 48 and tie bars 44 after molding to separate individual modules. See col., 3, lines 53-61. The side bars and tie bars of Pak provide external connections of the lead frame, but do not extend to internal portions of lead frame and do not connect to component termination pads. Therefore, these side bars and tie bars do not provide "temporary connection bars" as in the present invention. Moreover, the internal connection bars of the Pak lead frame remain permanently within the encapsulated package and are not removable. In fact, it would not be possible to remove any of the Pak connection bars after encapsulating them in molding material, because the molding compound is applied such that the internal connection bars and electrical components are completely covered. Thus, Pak also fails to suggest or disclose the application of molding compound such that the top and bottom surfaces of the termination pads and the connection bars remain uncovered.

As discussed previously, Sakamoto et al. discloses a hybrid integrated circuit device that includes a mounting board having a plurality of conductive patterns. The Examiner acknowledges the deficiency of Sakamoto et al., and now cites the reference merely for its disclosure of copper material for the conduction material of pads and bars. Even so, Sakamoto et al. fails to make up for the deficiencies of Pak in that it fails to suggest or disclose temporary connection bars.

More specifically, the references fail to suggest or disclose, *inter alia*, "a plurality of termination pads being linked together and to said semiconductor die pad by respective ones of said plurality of connection bars, ... at least one temporary connection bar providing temporary structural integrity of said lead frame substrate; and a molding compound fixing said semiconductor die pad, said plurality of termination pads, and said plurality of connection bars together, thereby permitting subsequent removal of said at least one temporary connection bar," as defined in Claim 1. Similarly, the references fail to suggest or disclose, *inter alia*, "a plurality of connection bars including at least one permanent connection bar and at least one temporary connection bar; ... and a molding compound fixing said plurality of semiconductor die pads, said plurality of termination pads, said plurality of connection bars, and said plurality of leads together, thereby permitting removal of said at least one temporary connection bar," as defined in Claim 35. The rejection of these claims, and all claims dependent thereon, should therefore be withdrawn.

In view of the foregoing, the Applicant respectfully submits that Claims 1-12, 35 and 37-39 are in condition for allowance. Reconsideration and withdrawal of the rejections is respectfully requested, and a timely Notice of Allowability is solicited. If the Examiner would consider it helpful to placing this application in condition for allowance, the Applicant encourages the Examiner to contact the undersigned counsel and conduct a telephonic interview.

To the extent necessary, Applicant petitions the Commissioner for a one-month extension of time, extending to June 21, 2006, the period for response to the Office

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Action dated February 21, 2006. The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0639.

Respectfully submitted,



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Date: June 20, 2006

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